

Gastroesophageal Reflux Disease among Pilgrims during the Hajj Period (1438 Hegira): Prevalence and Impact on the Quality of Life

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ABSTRACT

Background: Gastroesophageal reflux disease (GERD) is a chronic motility disorder resulting in reflux of stomach contents into the esophagus. It has a prevalence rate of 10-20% in the western world. In the Gulf region, the prevalence of GERD is not yet well characterized. Annually, millions of Muslims gather from across the world embark on a religious pilgrimage to Mecca in Saudi Arabia. They represent a population with various socio-demographic characteristics, life styles, dietary habits and social life stresses that might affect the prevalence of this chronic disorder. **Objective:** the aim of this study was to determine the prevalence and impact of GERD on the pilgrims in Mecca region during the Hajj period in the year 1438 Hegira.

Methods: participants were asked to fill a self-administered questionnaire, GERD questionnaire (GERDQ) and GERD-HRQL were used for making the diagnosis of GERD and to assess its impact on the patient's quality of life. **Results:** the prevalence of GERD among the study population was 29.0%, with a statistically significant association with age and nationality. Neither smoking nor the presence of other diseases showed statistically significant relationship with the presence of GERD ($p>0.05$). GERD-HRQL scale showed a statistically higher median in GERD patients compared to healthy subjects. Moreover, 58 participants (52.73%) showed poor quality of life compared to 52 participants (47.27%) who expressed good quality.

Conclusion: this study showed a prevalence rate of GERD among pilgrims in Mecca region to be 29.0%, which has an impact on their daily life activities. These data indicate a need for a comprehensive approach to GERD management in the health-care system.

Keywords: gastroesophageal reflux disease, pilgrims, Saudi Arabia, prevalence, quality of life.

INTRODUCTION

Gastroesophageal reflux disease (GERD) is a chronic motility disorder resulting in reflux of stomach contents into the esophagus⁽¹⁾. GERD is one of the most common gastrointestinal disorders in adults. It has a prevalence rate of 10-20% in the western world, whereas Asian countries have a lower rate of less than 5%. In the Gulf region, the prevalence of GERD is not yet well characterized⁽²⁾.

GERD represents a wide spectrum of GIT symptoms like heartburn, discomfort in the upper abdomen or acid regurgitation, which are essential for its diagnosis. In some patients, it leads to serious complications, such as esophageal stricture, gastrointestinal bleeding, or Barrett's esophagus⁽³⁾. In addition to these more classic manifestations, GERD is increasingly associated with extra-esophageal symptoms, including chronic cough, asthma, laryngitis, and dental erosions⁽⁴⁾.

There are many factors that can contribute to the development of this disease, including age, obesity, lifestyle factors such as smoking, physical activity and/or nutrition. Additionally, genetic factors may play an adjuvant role^(1,5).

The burden of the disease is large; it can influence the patient's health-related quality of life and affect dietary habits, productivity, and employment status^(6,7). A few studies have been done in Saudi Arabia on general population and have reported a very high prevalence⁽⁸⁾. Annually, millions of Muslims gather from across the world embark on a religious pilgrimage called the "Hajj" to Mecca in Saudi Arabia⁽⁹⁾. They represent a population with various socio-demographic characteristics, life styles, dietary habits and social life stresses that might affect the prevalence of this chronic disorder. So the aim of this study was to determine the prevalence and impact of GERD on the Pilgrims in Mecca region during the Hajj period in the year 1438 Hegira.

METHODS

Ethical considerations

Ethical approval was obtained from the Institutional Review Board of The Faculty of Medicine, Taif University. The study participants were not asked for their personal information. Subjects willingly participated in the study and an

informed consent was obtained from them. Data were kept confidential and were used only for our study purposes and no physical or mental harm was done to the subjects.

Study design

This cross-sectional study was conducted in Mecca region, Saudi Arabia. The study population included pilgrims of both sexes during the Hajj period in the year 1438 Hegira. Participants were asked to fill a self-administered questionnaire in front of the research assistant. We used the GERD questionnaire (GERDQ) for making the diagnosis of GERD. The GERDQ was developed as a patient-centered, self-assessment questionnaire to assist health-care professionals in the diagnosis of GERD. It has a sensitivity of 65% and a specificity of 71%. Those with a score of ≥ 8 have a diagnosis of GERD, while those with < 8 don't have GERD⁽¹⁰⁾.

To assess the impact of GERD on the patient's quality of life, we used GERD-HRQL questionnaire⁽¹¹⁾. Information about age, gender, smoking habit, asthma, diabetes mellitus and any related health disorders were also collected from each participant. They were asked about any history and frequency of heartburn, epigastric pain, regurgitation of food, sleep interference from GERD symptoms, and the use of over-the-counter antacids for the control of their symptoms. They were also asked about the effect of the GERD symptoms on their social interaction.

Statistical analysis

Statistical Package for Social Sciences Version 20.0 was used to analyze the data. Pearson's Chi-square (χ^2) test was used to observe and quantify an association between the categorical outcome and the different variables. Mann-Whitney U test was used to compare continuous non-normally distributed data. All calculated *P* values were two-tailed, with *P* < 0.05 considered as statistically significant.

RESULTS

This study was carried out on 414 subjects who completed the self-administered questionnaire. Their age ranged from 14 to 76 years and most of them were in the age group 30 to < 50 . Most of them were males (86.0%), approximately two-thirds (67.6%) were Arab and one third (32.4%) were Saudi. The family monthly income in about two-thirds (65.2%) ranged from < 5000 -10000 Saudi Riyal. According to GERD questionnaire, the prevalence of GERD among the study population

was 29.0%. About two-thirds (63.4%) of them belong to the age groups 30 to < 50 . Among those diagnosed as GERD patients, 85.0% were males, half of them (50%) were Arab and Saudi subjects, and in 40.0% of them the family income ranged from 5000-10000 Saudi Riyal. There was a statistically significant association between both age and nationality and the presence of GERD ($p < 0.05$) as demonstrated in **table (1)**. **Table (2)** demonstrates the association between certain habits and diseases and the presence of GERD, only 23.3% of GERD participants were smokers, 15.0% of them smoke < 20 cigarettes per day and most of them (71.4%) for ≤ 10 years. Great percent (91.7%) of GERD patients in this study did not have diabetes mellitus, and 75.8% did not give past history of diseases; asthma was the most frequent, either alone (5.8%) or combined with other diseases like hypertension and/or elevated triglycerides (5.8%). Neither smoking nor the presence of diseases showed statistically significant relationship with the presence of GERD ($p > 0.05$). In 60.0% of GERD participants, spicy and/or fatty foods were reported to aggravate the condition. A statistically higher percent (65.0%) of GERD questionnaire-diagnosed patients have not been diagnosed previously as GERD. More than half (58.3%) of GERD participants reported use of a combination of antacids, H₂-blockers and proton pump blockers to relieve their symptoms. **Table (3)** demonstrates a statistically higher percent of heart burn and regurgitation among GERD participants compared to their counter parts (88.1% and 56.9% versus zero% respectively). 52 GERD participants (43.3%) were satisfied with their condition, while the feeling of 30 participants (25.0%) was negative. GERD-HRQL scale was calculated to assess objectively the impact of GERD disorder on the participant health related quality of life. It ranged in GERD participants from 1.00 to 73.00 with a statistically higher median compared to healthy subjects (15.0 versus .00). According to GERD-HRQL scale, 58 participants (52.73%) showed poor quality of life compared to 52 participants (47.27%) who expressed good quality. There was no statistically significant association between ages, sex, nationality or family monthly income and the quality of life in GERD patients as illustrated in **table (4)**. Moreover, presence of smoking, diabetes mellitus, and other diseases like asthma, hypertension and hyperlipidemia have not been significantly associated with poor quality of life ($p > 0.05$) (**Table 5**).

Table 1: Association between socio-demographic characteristics and gastroesophageal reflux disease (GERD)

		Diagnosis of GERD						P value
		Yes, N=120(29.0%)		No, N=294 (71.0%)		Total, N=414 (100%)		
		N	%	N	%	N	%	
Age groups (years)	<30	22	18.3%	88	29.9%	110	26.6%	<0.001*
	30 to <40	38	31.7%	90	30.6%	128	30.9%	
	40 to <50	38	31.7%	68	23.1%	106	25.6%	
	50 to <60	22	18.3%	26	8.8%	48	11.6%	
	>60	0	0.0%	22	7.5%	22	5.3%	
Sex	Female	18	15.0%	40	13.6%	58	14.0%	0.711
	Male	102	85.0%	254	86.4%	356	86.0%	
Race	Arab	60	50.0%	220	74.8%	280	67.6%	0.005*
	Non- Arab	36	30.0%	132	44.9%	168	40.6%	
Nationality	Saudi	60	50.0%	74	25.2%	134	32.4%	<0.001*
	Non-Saudi	60	50.0%	220	74.8%	280	67.6%	
Family monthly Income (Saudi Riyal)	< 5000	36	30.0%	94	32.0%	130	31.4%	0.353
	5000-10000	48	40.0%	92	31.3%	140	33.8%	
	10000-15000	20	16.7%	56	19.0%	76	18.4%	
	>15000	16	13.3%	52	17.7%	68	16.4%	

Table 2: Association between smoking and the presence of diseases and gastroesophageal reflux disease (GERD)

		Diagnosis of GERD						P value
		Yes, N=120(29.0%)		No, N=294 (71.0%)		Total, N=414(100%)		
		N	%	N	%	N	%	
Diabetes mellitus	Yes	10	8.3%	22	7.5%	32	7.7%	0.769
	No	110	91.7%	272	92.5%	382	92.3%	
Smoking	Yes	28	23.3%	58	19.7%	86	20.8%	0.412
	No	92	76.7%	236	80.3%	328	79.2%	
Duration of smoking (years)	≤10	20	71.4%	36	64.3%	56	66.7%	0.513
	>10	8	28.6%	20	35.7%	28	33.3%	
Number of cigarettes/	<20	18	15.0%	42	14.3%	60	14.5%	0.521
	≥20	10	8.3%	16	5.4%	26	6.3%	
History of diseases	Asthma	7	5.8%	11	3.7%	18	4.3%	0.319
	Hypertension	3	2.5%	3	1.0%	6	1.4%	
	High blood glycerides	5	4.2%	11	3.7%	16	3.9%	
	Thyroid disorders	0	0.0%	8	2.7%	8	1.9%	
	Combination	7	5.8%	11	3.7%	18	4.3%	
	Others	7	5.8%	21	7.1%	28	6.8%	
	No	91	75.8%	229	77.9%	320	77.3%	
Factors increase GERD symptoms	Influenza	2	1.7%	2	0.7%	4	1.0%	<0.001*
	Smoking	8	6.7%	8	2.7%	16	3.9%	
	Hunger	2	1.7%	2	0.7%	4	1.0%	
	Spicy foods	24	20.0%	18	6.1%	42	10.1%	
	Fatty foods	22	18.3%	32	10.9%	54	13.0%	
	Spicy and fatty foods	48	40.0%	16	5.4%	64	15.5%	
	Drinking coffee and/ or tea	2	1.7%	8	2.7%	10	2.4%	
	Sleeping	0	0.0%	4	1.4%	4	1.0%	
No	12	10.0%	204	69.4%	216	52.2%		
History of previous GERD diagnosis	Yes	42	35.0%	14	4.8%	56	13.5%	<0.001*
	No	78	65.0%	280	95.2%	358	86.5%	
Medications used for GERD	Combination	70	58.3%	18	6.1%	88	21.3%	<0.001*
	Others	4	3.3%	6	2.0%	10	2.4%	
	No	46	38.3%	270	91.8%	316	76.3%	

*significant at p <0.05.

Table 3: Frequency of heart burn and regurgitation and their impact on the participant's health related quality of life

			Diagnosis of GERD			P value
			Yes N=120(29.0%)	No N=294(71.0%)	Total N=414 (100%)	
Do you have heart burn?	Yes	N	104	0	104	<0.001*
		%	88.1%	0.0%	88.1%	
	No	N	14	0	14	
		%	11.9%	0.0%	11.9%	
Do you have regurgitation?	Yes	N	66	0	66	<0.001*
		%	56.9%	0.0%	56.9%	
	No	N	50	0	50	
		%	43.1%	0.0%	43.1%	
Satisfaction	Yes	N	52	246	298	<0.001*
		%	43.3%	84.2%	72.3%	
	No	N	30	8	38	
		%	25.0%	2.7%	9.2%	
	Neutral	N	38	38	76	
		%	31.7%	13.0%	18.4%	
GERD-HRQL	Range		1.00-73.00	.00-34.00	.00-73.00	<0.001*
	Median		15.00	.00	.00	
	IQR		8.00-24.00	.00-.00	.00-10.00	
	Mean rank		320.77	148.02		

*significant at p <0.05.

Table 4: Association between socio-demographic characteristics and quality of life in gastroesophageal reflux disease (GERD).

		GERD-HRQL						P value
		Good quality 52 (47.27%)		Poor quality 58 (52.73%)		Total 110** (100%)		
		N	%	N	%	N	%	
Age groups (years)	<30	8	15.4%	10	17.2%	18	16.4%	0.385
	30<40	14	26.9%	20	34.5%	34	30.9%	
	40<50	16	30.8%	20	34.5%	36	32.7%	
	50<60	14	26.9%	8	13.8%	22	20.0%	
	>60	0	0.0%	0	0.0%	0	0.0%	
Sex	Female	4	7.7%	12	20.7%	16	14.5%	0.054
	Male	48	92.3%	46	79.3%	94	85.5%	
Race	Arab	30	57.7%	30	51.7%	60	54.5%	0.689
	Non- Arab	18	34.6%	18	31.0%	36	32.7%	
Nationality	Saudi	22	42.3%	28	48.3%	50	45.5%	0.530
	Non-Saudi	30	57.7%	30	51.7%	60	54.5%	
Family monthly Income (Saudi Riyal)	< 5000	12	23.1%	24	41.4%	36	32.7%	0.143
	5000-10000	28	53.8%	20	34.5%	48	43.6%	
	10000-15000	8	15.4%	8	13.8%	16	14.5%	
	>15000	4	7.7%	6	10.3%	10	9.1%	

** 10 missing values.

Table 5: Association between smoking and the presence of diseases and quality of life in gastroesophageal reflux disease (GERD)

		GERD-HRQL						P value
		Good 52 (47.27%)		Poor 58 (52.73%)		Total 110** (100%)		
		N	%	N	%	N	%	
Diabetes mellitus	Yes	6	11.5%	4	6.9%	10	9.1%	0.512
	No	46	88.5%	54	93.1%	100	90.9%	
Smoking	Yes	10	19.2%	14	24.1%	24	21.8%	0.534
	No	42	80.8%	44	75.9%	86	78.2%	
Duration of smoking (years)	≤10	6	60.0%	10	71.4%	16	66.7%	0.673
	>10	4	40.0%	4	28.6%	8	33.3%	
Number of cigarettes/ day	<20	4	7.7%	10	17.2%	14	12.7%	0.259
	≥20	6	11.5%	4	6.9%	10	9.1%	
History of diseases	Asthma	2	3.8%	5	8.6%	7	6.4%	0.411
	Hypertension	1	1.9%	0	0.0%	1	0.9%	
	High blood glycerides	4	7.7%	1	1.7%	5	4.5%	
	Thyroid disorders	0	0.0%	0	0.0%	0	0.0%	
	Combination	3	5.8%	3	5.2%	6	5.5%	
	Others	2	3.8%	5	8.6%	7	6.4%	
	No	40	76.9%	44	75.9%	84	76.4%	

** 10 missing values.

DISCUSSION

This study was the first to assess the prevalence of GERD among pilgrims in Mecca region that constitute a population with various socio-demographic characteristics, life styles, dietary habits and social life stresses. According to GERD questionnaire, the prevalence of GERD among the study population was 29.0%. This work also detected a statistically higher prevalence of GERD among Arab and Saudi subjects compared to other nationalities. Compared to this finding, a recent survey on Saudi school teachers reported higher prevalence of GERD⁽¹²⁾. In addition, a study on the general population in Saudi Arabia reported high (45.4%) prevalence rate of GERD⁽⁸⁾. Inconsistent prevalence has been reported in general population of different countries across the world including 31.6% in Spain, 40.0% in Switzerland, 25.7% in Iran, and 12% in Taiwan⁽¹³⁻¹⁶⁾.

Pathogenesis of GERD is multifactorial and more complex including internal factors as lifestyle and genetic predisposition⁽¹⁷⁾. External risk factor such as temperature and humidity may have possible roles. **Kanet *et al.*** reported that temperature and humidity trigger increased frequency of upper gastrointestinal symptoms⁽¹⁸⁾. However, **Pane *et al.*** found no significant correlation between climate exchanges to the upper gastrointestinal symptoms

among Indonesian Hajj Pilgrims in the year 1427 Hegira⁽¹⁹⁾.

Many factors have shown an association with GERD but still controversial. Male gender, hiatus hernia, and chronic obstructive pulmonary disease are three independent risk factors for the development of reflux esophagitis⁽²⁰⁾. The current study found a statistically higher prevalence of GERD among the study population with age range 30 to <50 years. In fact, the association between GERD and age is controversial. Some studies have reported a positive association^(21,22), while others found an inverse relationship^(23,24), and still others could not detect an association^(25,26). Our study has shown a higher prevalence of GERD in males. This disagrees with **Altwigry *et al.*** who reported high prevalence of GERD among Saudi female teachers⁽¹²⁾.

The current study revealed that only 23.3% of GERD participants were smokers, 15.0% of them smoke <20 cigarettes per day and most of them (71.4%) for ≤10 years with no significant association between smoking and GERD. A similar finding was reported by others^(13,27). In contrast, a direct relationship between GERD and smoking was reported by **Nilsson *et al.***⁽¹⁷⁾ and **Nocon *et al.***⁽²⁸⁾.

Great percent (91.7%) of GERD patients in the current study did not have diabetes mellitus, and

75.8% did not give past history of diseases. Asthma was the most frequent either alone (5.8%) or combined with other diseases like hypertension and/or elevated triglycerides (5.8%). In contrast to these findings, a systematic review reported the prevalence of GERD symptoms to be 45% to 71% in patients with asthma⁽²⁹⁾. The relationship between diabetes mellitus and GERD is still debated and not fully understood. **Nishida et al.**⁽³⁰⁾ have shown that type 2 diabetes is a risk factor for symptomatic GERD and a higher prevalence (28%) of abnormal GERD appeared among asymptomatic diabetic patients than among the general population⁽³¹⁾. A recent study on Korean patients with type 2 diabetes revealed no difference in GERD prevalence compared to healthy control group⁽³²⁾. In this study, more than half of GERD participants reported that spicy and/or fatty foods aggravate the condition. This agrees with **Jarosz et al.**⁽¹⁾ who found an association between the severity of typical GERD symptoms and fatty, fried, sour, or spicy food and sweets.

According to GERD-HRQL scale, 58 (52.73%) GERD patients in this study showed poor quality of life compared to 52 participants (47.27%) who expressed good quality. There was no statistically significant association between ages, sex, nationality or family monthly income and the quality of life in GERD patients. Moreover, poor quality of life did not show significant association with smoking, diabetes mellitus and/or other diseases like asthma, hypertension and hyperlipidemia. The impact of symptoms on patients' daily life is one of the most common reasons for consultation for GERD⁽³³⁾. The effect of the severity and frequency of GERD on the patient's quality of life has been studied among Swedish general population and have found that even symptoms rated as mild were associated with a clinically meaningful reduction in well-being^(34,35).

Conclusion:

This study reported a prevalence rate of GERD among pilgrims in Mecca region to be 29.0%, which has an impact on their daily life activities. These data indicate a need for a comprehensive approach to GERD management in the health-care system.

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